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Electronically Filed

Ms. Marlene H. Dortch
Secretary
Federal Communications Commission
445 Twelfth Street, S.W.
Washington, D.C. 20054

Re: Written *Ex Parte* Communication
WT Docket Nos. 96-86, 06-150 and 06-169; PS Docket No. 06-229

Dear Ms. Dortch:

IPWireless hereby submits these written *ex parte* comments in the above captioned proceedings regarding the development of rules governing commercial wireless and public safety licenses in the 700 MHz spectrum band. IPWireless is a leading developer and supplier of standards-based mobile broadband technologies, and is a wholly-owned subsidiary of the NextWave Wireless Inc., a company focused on next generation broadband wireless technologies and services. IPWireless supports the premise that a shared public safety/commercial network spanning portions of the Upper 700 MHz band and public safety broadband spectrum, as proposed by Frontline and others, is technologically feasible and will not compromise the demanding priority, security and resilience requirements of public safety, if such a network were appropriately implemented.

Through Northrop Grumman, IPWireless is the supplier of the wireless broadband technology to the New York City public safety network, which is the largest and most significant public safety broadband network to date. With this experience, IPWireless is well qualified to comment on the technical feasibility of a shared network approach and supports the comments of Northrop Grumman filed on June 27, 2007 in this proceeding. While the New York City network is not supporting commercial customers, it does

support both public safety users and non-mission-critical government operations that require very different levels of service and priority. It is, therefore, a technological model that is applicable to shared public safety/commercial networks, such as that proposed for the 700 MHz band.

The IPWireless 3GPP UMTS TD-CDMA technology used by Northrop Grumman in the New York City wireless public safety network incorporates features that make it inherently suited to shared public safety/commercial infrastructure applications without impairing its ability to meet the demanding priority, security and resilience requirements of public safety. The features that allow such sharing break down into six categories: user prioritization, application prioritization (at the IP packet level), priority signaling channel access, separate core network routing of public safety and commercial users, secure user authorization, and secure network management. Each of these features is described in greater detail below.

- **User prioritization** is accomplished by the "Tier of Service" feature in the TD-CDMA network. Each user is allocated to a particular tier of service, and the network operator assigns a proportion of network capacity to each tier. Public safety users in the highest tier(s) get priority over commercial users in lower tiers in every resource scheduler cycle (100 times every second). In any scheduler cycle, capacity that is not used by the high priority users is made available to lower tiers, such that no capacity is wasted. When a major incident occurs, the network operator is able to allocate even more capacity to the public safety user tiers.

- **Application priority** is based on IP "packet inspection" internally within the wireless network on both the downlink to the user and the uplink from the user. The network operator is able to set the priority given to each application type, IP port number or destination IP address. Application priority usually works within each Tier of Service (as described above) such that a high priority application of a commercial user does not take priority over a public safety user. However, an "emergency call" from a commercial user can be given priority above the user's normal Tier of Service at the discretion of the network operator.

- **Priority signaling channel access** deals with a situation, such as a natural disaster or major incident, where commercial users attempting to access the network to communicate with friends and family or get news updates congest the signaling channels, impeding access to the system by public safety users to the extent that they cannot even get on to the network. The TD-CDMA standard supports mechanisms for priority access to the Random Access Channel (RACH), which is used for initial system access. Public safety users can be assigned to a high priority access class, preventing commercial users from blocking public safety access to the system.

- The IPWireless TD-CDMA network supports **separate tunneling** of public safety and commercial users through the IP core network to different destinations. For example, commercial users might be routed to the public Internet while public safety users are routed to a secure and private intranet (such as the Police Department network). End-to-end VPN encryption is employed for public safety users, spanning both the radio access network and the IP core network.

- As a 3GPP UMTS technology, TD-CDMA uses the GSM SIM or UMTS uSIM card for **secure authentication** of users on to the radio access network. A second level of authorization enables public safety users to be further authenticated at the entrance to the public safety network, preventing commercial users from accessing public safety applications or confidential data.

- **Network management of network elements** such as base stations and controllers is carried over a secure encrypted VPN, to which users on the network have no access. This prevents commercial users from maliciously disrupting the network.

In addition to these features, which provide the necessary partitioning of public safety and commercial users, the TD-CDMA technology provides the high data throughputs necessary to ensure that there is sufficient capacity to share between the two groups of users. In particular, TD-CDMA uses inter-cell interference cancellation to provide high cell edge throughput even in limited spectrum allocations, which is critical for public safety in situations where a major incident occurs at a cell edge location. By operating with a single channel (for example 10 MHz wide), spanning both the Upper 700 MHz commercial band and the immediately adjacent public safety broadband spectrum, TD-CDMA is able to economically provide a large amount of capacity to make sharing between public safety and commercial users feasible.

The combination of capabilities described above enables public safety traffic in a shared network to be treated as a separate partition from commercial traffic and to receive the highest priority and protection, while also providing the necessary security required for pubic safety communications. For example, a retail ISP could use the wireless transport capabilities of a network such as that deployed in New York City to offer open access to the Internet without affecting the reliability, priority and security of the public safety traffic. Moreover, the retail ISP could allow the user to connect any device to the network that conformed to the published protocols and adhered to FCC "do no harm" rules.

While as a technology TD-CDMA is able to support a shared network concept, it is of course dependent on the system integrator and network operator implementing the network to meet the high standards and requirements of public safety. IPWireless cannot speak for potential system integrators and operators, but we would expect that they would recognize that this is fundamental to the success of a shared network.

IPWireless is active in the 3GPP standards body and is a contributor to the 3GPP Long Term Evolution (LTE) standards development, which is the evolution path of TD-CDMA. Based on this work, we believe that LTE will incorporate features to support shared networks similar to those described above. Such features, in fact, are necessary for LTE as well as for the wireless broadband standards developed by 3GPP2 and IEEE 802.16 to be competitive in a dynamic market, which will expand the technological options available for shared public safety/commercial networks.

As the 700 MHz band will not become available until 2009, there is a perfect opportunity for public safety to take advantage of the latest and most advanced "3G" and "4G"technologies and to move beyond legacy technologies, which are already coming towards the end of their life. Public safety should not be a dumping ground for obsolete technologies, but instead should be enabled to take advantage of the latest broadband wireless developments and capabilities.

In conclusion, there should be no concern that advanced wireless broadband network technologies will not be able support a shared public safety/commercial network or compromise the priority, security and resilience required for public safety transmissions. The New York City public safety network may provide useful technological insight with respect to shared public safety/commercial networks, such as that proposed for the 700 MHz band.

Respectfully submitted

Roger P. Quayle
CTO
IPWireless, Inc.

cc:

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